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EXAMINER	
WOZNIAK, JAMES S	
ART UNIT	**PAPER NUMBER**
2655	

DATE MAILED: 02/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/832,132	CHEN, JUIN-HWEY	
	Examiner	Art Unit	
	James S. Wozniak	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26 and 29-47* is/are rejected.

7)☒ Claim(s) *27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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DETAILED ACTION

Response to Amendment

1. In response to the office action from 7/18/2005, the applicant has submitted an amendment, filed 11/18/2005, arguing to traverse the art rejection based on the limitations of claims 1, 20, and 29 *(Amendment, Pages 19-31)*. The applicant's arguments have been fully considered but are moot with respect to the new grounds of rejection in view of Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)*.

Claim Objections

2. **Claim 26** is objected to because of the following informalities: in lines 6-7, "each of the ZERO-INPUT response error vectors" should be changed to --each of the ZERO-STATE response error vectors-- in order to provide proper antecedent basis. The examiner has interpreted "each of the ZERO-INPUT response error vectors" to mean each of the ZERO-STATE response error vectors for the application of the prior art.

Appropriate correction is required.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. **Claims 1-47** are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-24 of U.S. Patent No. 6,890,951 in view of Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)*. U.S. Patent: 6,890,951 claims a system and method for selecting codevectors which minimize a quantization error that is similar to that of the presently claimed invention with the addition of the use of zero-input and zero state response error vectors. The addition of such features to said patent would have been obvious to one of ordinary skill in the art at the time of invention, however, as is evidenced by the Watts et al (Pages 276-277, Section 3) reference, which teaches the use of said error vectors for the benefit of complexity reduction in a codebook search. Thus, the presently claimed invention would have been obvious over U.S. Patent: 6,890,951 in view of the Watts et al reference.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. **Claims 1, 3-6, 8-9, 12, 15, 29, 31-34, 36-37, 40, and 43** are rejected under 35 U.S.C. 102(b) as being anticipated by Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)*.

With respect to **Claims 1 and 29**, Watts discloses:

Predicting the speech signal to derive a residual signal *(Page 275, Section 2)*;

Deriving a zero-input response error vector common to teach of the N VQ codevectors, wherein the zero-input response error vector is a component of a quantization error vector *(Pages 276-277, Section 3 and Fig. 2)*;

Deriving N zero-state response error vectors each based on a corresponding on e of the N VQ codevectors, wherein each of the zero-state response error vectors is a component of a quantization error vector *(Pages 276-277, Section 3 and Fig. 2)*; and

Selecting the preferred on e of the N VQ codevectors as the VQ output vector corresponding to the residual signal based on the zero-input response error vector and the N zero-state response error vectors *(optimal codevector selection, Pages 275-277, Sections 2-3)*.

With respect to **Claims 3 and 31**, Watts further discloses:

Deriving an intermediate vector based on the residual signal *(codevector elements, Pages 275-276, Section 2)*;

Predicting the intermediate vector to produce a predicted intermediate vector *(predicted samples, Pages 275-276, Section 2)*;

Combining the intermediate vector with the predicted intermediate vector and a noise feedback vector to produce the zero input response error vector *(Page 276-277, Section 3 and noise feedback, Page 277, Section 4)*; and

Filtering the zero-input response error vector to produce the noise feedback vector *(noise feedback filtering, Page 277, Section 4, Fig. 1b)*.

With respect to **Claims 4 and 32**, Watts further discloses:

Long term predicting the intermediate vector to produce the predicted intermediate vector (delayed determination of predicted codevectors, Pages 275-276, Section 2);

Long-term filtering the zero-input response error vector to produce the noise feedback vector *(noise feedback filtering utilizing a precomputed zero input response, Page 277, Section 4, Fig. 1b)*.

With respect to **Claims 5 and 33**, Watts recites:

Predicting an intermediate vector based on an initial predictor state corresponding to a previous preferred codevector (prediction based upon a previous vector, Page 276, Section 2);

Filtering the ZIR error vector based on an initial filter state corresponding to the previous preferred codevector *(post filter, Fig. 1c; and ZIR filter output based only on previous vectors)*.

With respect to **Claims 6 and 34**, Watts further discloses:

Combining the residual signal with a noise feedback signal to produce an intermediate vector *(noise feedback, Page 277, Section 4)*;

Predicting the intermediate vector to produce a predicted intermediate vector *(predicted samples, Pages 275-276, Section 2)*;

Combining the intermediate vector with the predicted intermediate vector to produce an error vector *(Page 276-277, Section 3)*; and

Filtering the error vector to produce the noise feedback signal *(noise feedback filtering, Page 277, Section 4; Fig. 1b)*.

Claims 8 and 36 contain subject matter similar to claims 5 and 33, and thus, are rejected for the same reasons.

With respect to **Claims 9 and 37**, Watts teaches a filter output corresponding to a ZSR response error and the combination of a zero state input vector with a codevector *(Pages 276-277 Section 3; Fig. 2)* in a system for optimal codevector determination, as applied to Claims 1 and 29.

With respect to **Claims 12 and 40**, Watts discloses:

Separately combining each of the N VQ codevectors with a corresponding one of N filtered, ZSR error vectors to produce the N zero state response error vectors *(combining a trail codevector with a ZSR error vector, Fig. 2a; Pages 276-277, Section 3)*;

Separately filtering each of the N ZSR error vectors to produce the N filtered, ZSR error response vectors *(post-filtering, noise feedback filtering, Page 277, Section 4; Figs. 1b and 1c)*.

With respect to **Claims 15 and 43**, Watts discloses:

Deriving a gain value based on the speech signal and filtering at least some of the N VQ codevectors based on the gain value *(gain normalized vectors, Page 278, Section 5, and scaling, Figs. 1b and 1c)*.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 2, 18, 30, and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)* in view of Iijima et al *(U.S. Patent: 5,828,996)*.

With respect to **Claims 2 and 30**, Watts teaches the method for optimal codevector determination utilizing a prediction residual, zero input response, and zero state response, as applied to claims 1 and 29. Watts does not specifically disclose producing error vectors having an error energy value in determining an optimal codevector, however Iijima teaches the generation of such codevectors *(distance calculating means, Col. 23, Line 59- Col. 24, Line 62)*.

Watts and Iijima are analogous art because they are from a similar field of endeavor in optimum codevector determination. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Watts with the distance calculation taught by Iijima in order to provide a method for satisfactorily encoding speech of various configurations that is capable of minimizing a vector quantization error *(Iijima, Col. 1, Lines 44-46; Col. 7, Lines 12-38)*.

With respect to **Claims 18 and 46**, Watts teaches calculating a zero-state response error as applied to claims 1 and 29, while Iijima further teaches periodically determining speech parameters periodically Col. 4, Line 65- Col. 5, Line 5; Col 23, Line 59- Col. 24, Line 62), and thus, also determining a zero-state error periodically since speech parameters are utilized in calculating a ZSR error.

9. **Claims 7, 10, 13, 16, 17, 35, 38, 41, 44, and 45** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)* in view of Cuperman et al (U.S. Patent: 4,963,034).

With respect to **Claims 7 and 35**, Watts discloses the delayed determination of predicted codevectors *(Pages 275-276, Section 2)* and the use of noise feedback *(Page 277, Section 4)*, while Cuperman further teaches the use of short term filtering in a zero state response error calculation *(Col. 3, Lines 48-67; Col. 8, Line 34- Col. 9, Line 22)*.

Watts and Cuperman are analogous art because they are from a similar field of endeavor in optimum codevector determination. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Watts with the short term filtering taught by Cuperman in order to provide a means for ensuring that reconstructed speech properly reflects changes in a speaker's vocal pattern *(Cuperman, Col. 2, Lines 62-66)*.

With respect to **Claims 10, 13, 38, and 41**, Cuperman further teaches the use of short term filtering in a zero state response error calculation *(Col. 3, Lines 48-67; Col. 8, Line 34- Col. 9, Line 22)*.

With respect to **Claims 16 and 44**, Watts teaches the method for optimal codevector determination utilizing error vector filtering, as applied to claims 12 and 40. Watts does not specifically suggest filtering codevectors according to derived filter parameters, however Cuperman teaches such a filtering method *(Col. 6, Lines 24-60)*.

Watts and Cuperman are analogous art because they are from a similar field of endeavor in optimum codevector determination. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Watts with the predictor filter

parameter determination method taught by Cuperman in order to ensure that reconstructed speech properly reflects changes in a speaker's vocal pattern *(Cuperman, Col. 2, Lines 62-66)*.

With respect to **Claims 17 and 45**, Cuperman further teaches updating filter parameters every pitch period and not performing a update for unvoiced (zero input) speech, which would not allow for the calculation of a zero state response since such a calculation requires an input voiced speech vector *(Col. 6, Lines 24-40; Col. 8, Lines 34-51)*. Also, Watts teaches the process of selecting an optimal codevector as applied to claims 1 and 29.

10. **Claims 11, 14, 39, and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts et al *("A Vector ADPCM Analysis-by-Synthesis Configuration for 16 kb/s Speech Coding," 1988)* in view of Chen et al *(U.S. Patent: 4,969,192)*.

With respect to **Claims 11, 14, 39, and 42**, Watts teaches the method for optimal codevector determination utilizing a prediction residual, zero input response, and zero state response, as applied to claims 9, 12, 37, and 40. Watts does not teach zeroing a filter state before determining a zero state response error, however Chen teaches setting a filter state to zero for each speech vector *(Col. 6, Lines 24-60)*.

Watts and Chen are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Watts with the filter zeroing method taught by Chen in order to eliminate ringing due to a previous vector in speech vector processing *(Chen, Col. 6, Lines 37-43)*.

11. **Claims 19 and 47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts et al in view of Sasaki *(U.S. Patent: 5,475,712)*.

With respect to **Claims 19 and 47**, Watts teaches the system for selecting vectors to minimize a quantization error as applied to claims 1 and 29. Watts does not specifically a periodic gain update, however Sasaki teaches updating a gain factor every other frame in Fig. 2.

Watts and Sasaki are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Watts with the gain updating method as taught by Sasaki in order to implement adaptive speech reproduction based on changing noise conditions *(Sasaki, Col. 2, Lines 39-51)*.

12. **Claims 20-23 and 25-26** are rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al *(U.S. Patent: 5,828,996)* in view of Mermelstein et al *(U.S. Patent: 6,249,758)*.

With respect to **Claim 20**, Iijima discloses:

Deriving a sequence of residual signals corresponding to a sequence of input speech training signals *(deriving residuals, Col. 2, Line 64- Col. 3, Line 14; codebook training (learning), Col. 11, Line 46- Col. 12, Line 4)*;

Quantizing each of the residual signals into a corresponding preferred codevector selected from an initial set of N codevectors to minimize a quantization error associated with the preferred codevector, thereby producing a sequence of preferred codevectors corresponding to the sequence of residual signals *(selecting a series of vectors from a codebook that minimizes a quantization error, Col. 23, Line 59- Col. 24, Line 62)*;

Deriving total quantization error energy for one of the codevectors based on the quantization associated with each occurrence of the one of the codevectors in a sequence of preferred *(distance calculation used to determine quantization error energy, Col. 23, Line 59- Col. 24, Line 62)*;

Although Iijima teaches a means for selecting codevectors that minimize a quantization energy, Iijima does not specifically suggest using the selected codevectors to update a codebook, however Mermelstein teaches such a method for updating a codebook *(Col. 6, Lines 20-26)*.

Iijima and Mermelstein are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Iijima with the codebook updating means taught by Mermelstein in order to implement a coding method capable of better predicting pitch characteristics of a speech signal through the use of an adaptive codebook *(Mermelstein, Col. 1, Line 66- Col. 2, Line 2)*.

With respect to **Claims 21-22**, Iijima further teaches processing performed on multiple vectors (Col. 5, Lines 10-20) and a learning process involving multiple vectors *(Col. 27, Lines 4-7)*.

With respect to **Claim 23**, Iijima further teaches an error threshold used in a codebook update *(Col. 26, Line 57- Col. 27, Line 7)*.

With respect to **Claim 25**, Iijima further teaches multi-dimensional vectors *(Col. 20, Lines 32-45)*.

With respect to **Claim 26**, Iijima recites:

Deriving a zero-input response error vector common to teach of the N VQ codevectors *(reference vector error, Col. 23, Line 59- Col. 24, Line 62)*;

Deriving N zero-state response error vectors common to teach of the N VQ codevectors *(zero-state distance calculation, Col. 23, Line 59- Col. 24, Line 62)*;

Separately combining the zero-input response error with each of the zero state response error vectors *(codebook search for a minimum quantization error energy utilizing a reference error vector and a zero-state distance calculation, Col. 23, Line 59- Col. 24, Line 62)*; and

Selecting one of the codevectors corresponding to a minimum one of the N quantization error energy values as the predefined codevector *(Col. 23, Line 59- Col. 24, Line 62)*.

13. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Iijima et al *(U.S. Patent: 5,828,996)* in view of Mermelstein et al *(U.S. Patent: 6,249,758)*, and further in view of Gao et al (U.S. Patent: 6,104,992).

With respect to **Claim 24**, Iijima in view of Mermelstein teaches that method for updating a codebook with codevectors having minimized quantization error energy, as applied to Claim 20. Iijima in view of Mermelstein does not specifically suggest the use of a scalar vector, however Gao teaches the use of such a vector in an adaptive codebook *(Col. 9, Lines 65-67)*.

Iijima, Mermelstein, and Gao are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Iijima in view of Mermelstein with the use of a scalar vector as taught by Gao in order to enable full rate encoding having a bit rate of 11.0 kbps *(Gao, Col. 4, Lines 28-37)*.

Allowable Subject Matter

14. **Claims 27-28** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claim 27**, the prior art of record fails to explicitly teach or fairly suggest a method for updating a codebook with codevectors having a minimized quantization error energy that utilizes a zero input response error and multiple zero state response error vectors, wherein the zero state error vectors are generated by combining a speech codevector with a feedback signal that results from short-term filtering the zero state response error vectors.

Claim 28 further limits claim 27, which contains allowable subject matter, and therefore, also contains allowable subject matter.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Swaminathan et al *(U.S. Patent: 5,734,789)*- teaches a method for determining a target vector utilizing a ZIR and ZSR.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
1/25/2006

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER

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